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Mandatory national quality improvement systems using indicators: An initial assessment in Europe and Israel

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ABSTRACT

Introduction: Quality improvement systems (QIS) that are based on empirical performance assessment have increasingly been implemented as a mandatory part of health systems across countries. This study aims to describe national mandatory QIS in Europe in 2014.
Materials and methods: Relevant national agencies for national mandatory QIS in Europe were identified through online searches and key informants. A questionnaire was compiled during a workshop with these agencies and filled out by representatives from these particular agencies.
Results: Agencies in charge of national mandatory QIS in seven countries (Denmark, France, Germany, Israel, Scotland, Sweden and Switzerland) were included in the study. An analysis of QIS revealed similarities, such as the use of routine data for performance assessment and the aim to hold healthcare providers accountable. Differences relate to the different forms of feedback systems and improvement mechanisms used. Trends include the development towards greater implementation of QIS within health systems, the inclusion of the patient's perspective in performance assessment, and experiments with pay for performance-related measures.
Conclusion: On a country level, for health systems striving for newly implementing QIS it is recommended to start where routine data is available, add qualitative methodologies once the QIS is getting more complex, report performance data back to service providers and be patient centred.

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On the inter-country level exchange of information between agencies commissioned with implementing national QIS is very much needed for

1. Better understanding the other systems;
2. Gaining inspiration;
3. Working towards obtaining better evidence on the impact that the different tools used and measures taken by national QIS have on the quality of care at health system level.

1. Introduction

Quality improvement systems (QIS) which aim to encourage healthcare organisations to improve quality and performance [1] and that are based on empirical performance assessment, are increasingly being implemented on a national level as an integral and mandatory part of a country's health system [2]. Being based on empirical performance assessment means that data is systematically collected for indicators on healthcare structures, processes and outcomes.

Across Europe and also globally, there is awareness that the quality of healthcare does not always meet expected standards and that inequalities remain in access, delivery and outcomes. Value for money and the level of spending on healthcare is often felt to be unsatisfactory [3]. Moreover, the use of empirical performance assessment also highlights an increasing demand for transparency and accountability in all public processes, including healthcare to which all citizens are exposed, and which are also vital to them. Despite the growing interest in QIS that are based on indicators, little is known about the actual status and activities of national QIS in Europe. While there are numerous publications that deal with the challenges of QIS by considering their contents and conceptions [4,5], hardly anything has been published on the operational issues arising from implementing QIS at national and health system level.

National QIS reflect historical developments and traditions of health systems and they consider local requirements as well as specific responsibilities in healthcare. These differ in each country [6]. As a result, each national QIS is unique and varies by status and measurement [7]. However, the challenges that national QIS face are often similar: for instance, finding performance indicators that are meaningful, distinguishing between "good" and "poor" quality while being technically implementable, communicating results in a way that is understandable to lay persons, including patients' perspectives, and translating results of performance assessment into quality management. The approach to these and any other challenges may differ across countries but the purpose of national QIS are similar, i.e. to address inequalities in healthcare provision by creating external motivation for healthcare organisations to change and in doing so achieve better performance. Furthermore, what some national QIS have in common is that they are mandatory. Mandatory means that healthcare providers cannot opt out of providing data to the QIS. Therefore, data assessment methods need to be applicable to all health services in a country and mandatory QIS need to respect and adhere to regulations and legal constraints of the respective health system and country. This legal and operational framework is what distinguishes national and mandatory QIS from voluntary QIS. It leaves its mark in their governance and how they are embedded in the respective health system.

Despite the common challenges of national QIS and despite their aims being similar, there is very little exchange of information between national QIS. This is even more relevant as the differences between national QIS might not only be a result of the different health and legal systems and traditions, but might also be related to a lack of evidence regarding the consequences of such different approaches at national level and the lack of exchange of experiences between countries [8].

Against this background, the study presented here aims to explore the status and functioning of QIS in Europe that are nationwide, use indicators for performance assessment and are mandatory. It describes the practice of these national mandatory QIS in 2014 from an operational point of view. The interest lies particularly in documenting the characteristics of national QIS, in exploring what these programmes have in common and in which way they differ with regard to governance structures, organization of information systems and regulation of performance improvement.

2. Materials and methods

2.1. Study design

Online survey with key informants, supported by a group meeting.

2.2. Sample

Included were agencies in Europe tasked to develop and implement mandatory, nationwide QIS in healthcare, using indicators for empirical performance assessment.

Relevant agencies were identified through the website of the European Union Network for Patient Safety and Quality of Care, PaSQ Joint Action, the list of attendees of the European Commission's Working Group on Patient Safety and Quality of Care, the OECD Health Care Quality Indicators Project, and the 2013 conference of the International Society for Quality in Healthcare (ISQua). Once an agency or individual had been identified, they were contacted via e-mail to verify that they were indeed operating a

national QIS by indicators. They were also asked to identify additional agencies which could be included in the study. Identified agencies were invited to a workshop meeting.

Every agency contacted, consented to their participation and contributed to this paper. The sample included six European countries and Israel which was selected because of its strong links with Europe. The respective agencies that implement nationwide mandatory QIS in healthcare using indicators included:

- Denmark (DK): Clinical Quality Program of the Regions.
- France (FR): Haute Autorité de Santé (HAS).
- Germany (DE): AQUA—Institute for Applied Quality Improvement and Research in Health Care GmbH.
- Israel (IL): Israel National Program for Quality Indicators in Community Healthcare.
- Scotland (SC): Healthcare Improvement Scotland.
- Sweden (SE): National Board of Health and Welfare (Socialstyrelsen).
- Switzerland (CH): Federal Office of Public Health (FOPH, Bundesamt für Gesundheit).

In April 2014, a two-day workshop with representatives of all identified agencies took place in Germany. The aims of the workshop were to get an overview on practices of QIS in other health systems and to design an online questionnaire to provide further information on the delivery of QIS in the seven countries. During the workshop, each country presented its respective QIS, including scope, history and working principles.

2.3. Questionnaire

A questionnaire was drafted to assess the practice of the national QIS systems. The line of questions followed more or less the natural course of data assessment, analysis and feedback which is part of the daily work of QIS agencies, but is also in line with the Plan-Do-Study-Act (PDSA) cycle. The draft was discussed with all participants at the workshop and adjusted accordingly. The final questionnaire consisted of 46 questions that assessed the practice of mandatory and national performance measurement using indicators in four domains:

(1) *Governance*: including the mandate for quality assessment, responsibilities, financing and healthcare sectors covered;
(2) *Measurement methodology*: including methods and scope of assessment, as well as data sources used;
(3) *Data analysis and interpretation*: including issues such as reference ranges, assessment of reliability, validity, discriminative power, indexing;
(4) *Improvement mechanisms*: including scope and methodology of reporting data to various audiences including the public and consequences derived from assessment results.

The type of questions were either closed multiple choice questions – such as "Who mandates quality assurance?", or open free text questions – such as "For which indicators are outcomes of QIS publicly reported? Please provide examples".

The questionnaire was completed after the workshop, with verification and clarification being sought from participants where appropriate. The data was transferred into tables to enable analysis of responses. The contents of the tables were processed for presentation in this publication. The drafts were sent to all participants for verification of the presentation of their own QIS. As such, all participants are co-authors to this publication.

3. Results

All seven agencies filled out all 47 questions of the questionnaire. Box 1

presents brief descriptions of the respective QIS in the seven countries.

Box 1: Profiles of national and mandatory quality improvement systems (QIS) using indicators.

Denmark

Healthcare system: the Danish healthcare system is public, mainly financed through taxes and is organized across three administrative levels including the state, regions and municipalities. The state mainly has a regulatory function at hospital level as well as setting political standards and goals for healthcare services nationwide. Danish hospitals and outpatient medical care are owned and run by the five Danish regions whilst municipalities are responsible for rehabilitation, long-term care, health promotion and illness prevention programmes.

QIS governance: the Danish QIS stemmed from voluntary clinical registries that were founded by scientific medical societies. Today, there are more than 60 registries that are overseen by regional governments who are responsible for the management, financing and data protection within the registries. Legally, the regions have the last word in setting priorities and making decisions on behalf of the clinical registries. This, however, is usually decided in a dialogue between regions, medical societies and health authorities. Based on an agreement between the professional societies and the regions, the professional boards of the registries are responsible for their own decisions. These boards are appointed by the professional societies.

Performance assessment: since QIS is mandated by healthcare legislation, reporting of person-identifying data to the registries can take place without patient consent. It is mandatory for all healthcare organizations.

Improvement mechanisms: results from data collection are reported monthly in some clinical areas, and quarterly to the clinicians and regional management information systems. A report is released annually with more detailed analysis of results and recommendations. All results from indicator assessment are publicly available at unit level on the internet. Consequences for service providers not achieving the expected quality of care are dealt with by the registries themselves. They range from mandatory naming and shaming providers publicly at unit level, to coercion by the line management of the registries or to implementing consequences by applying certain contractual conditions.

France

Healthcare system: a public health insurance scheme ensures universal coverage of healthcare to all residents in France. Healthcare is regulated centrally by the state (Ministry of Health) providing a general governance framework to regional health agencies (ARS). These are in charge of developing specific action plans at regional level including licensing, funding, restructuring services, regulatory inspections, and regional public health plans.

QIS governance: the French QIS is based on the accreditation programme for hospitals. This was legally mandated in 1996. It aims at improving the quality and safety of care by generating sustainable changes in procedures, accountability and providing information to the public. The programme plays an increasing role within healthcare regulation. It is conducted by the Haute Autorité de Santé (HAS, the French National Authority for Health), which is a public scientific body with financial autonomy and is active in various fields of healthcare quality assurance, including the accreditation programme for hospitals. The HAS reports to the French parliament and the government.

Performance assessment: since 2008, the accreditation programme has included the mandatory assessment of indicators for specific clinical areas. Results of these indicators are included in the accreditation assessment. Accreditation is renewed every four years, while indicators are assessed every two years.

Improvement mechanisms: health care services have access to individual and comparative results of national quality indicators. In addition, they have access to quality data narrowed down by department. Accreditation decisions extend from full accreditation to accreditation with recommendations, accreditation with reservations, conditional accreditation, and no accreditation [43]. If the need for improvement is identified, follow-up measures with the respective healthcare organisation are implemented. Once this has happened, any reservations to the accreditation may be removed, maintained or changed.

Germany

Healthcare system: the healthcare system in Germany is mainly financed by statutory health insurance companies which insure about 90% of the population, while the rest are mostly privately insured. The scope of services available to the population under the statutory health insurance scheme is governed centrally by the Federal Joint Committee (FJC, Gemeinsamer Bundesausschuss). The FJC is the joint self-governing body of physicians, dentists, hospitals and health insurance funds.

QIS governance: the FJC also regulates QIS. It has mandated a private research institute, the AQUA Institute, with operating the national mandatory QIS. In 2016, this mandate will be passed over to a newly founded public national institute for quality assessment.

Performance assessment: currently, the QIS evaluates quality exclusively by indicators. These indicators are assessed annually for 30 clinical areas in all German hospitals that provide the respective care. Depending on the caseload of the clinical area, data is collected either directly by the AQUA Institute or by the 17 state (Länder) administrative offices for quality assurance.

Improvement mechanisms: consequences for not meeting required quality standards are likewise moderated either by the AQUA Institute or the state's administrative offices for quality assurance. Such consequences can range from a simple follow-up of quality results, to imposing consequences on healthcare providers.

Israel

Healthcare system: the National Health Insurance Law (1995) ensures that all permanent residents and citizens of Israel enjoy universal coverage and are entitled to a whole host of benefits and services, including primary care, diagnosis and treatment, acute hospitalizations, rehabilitation and psychiatric care. The benefits and services are specified under the law and updated annually. All citizens are required to enroll in one of the four Health Maintenance Organizations (HMO). There is a free choice of HMO and switching is easy. The system is financed by taxes, both general and earmarked payroll tax (health tax) collected by the National Insurance Institute and also from relatively low out-of-pocket co-payments.

QIS governance: the QIS in Israel started as a research project funded by the National Institute for Health Policy Research (NIHPR) and was adopted as a national quality programme by the Ministry of Health in 2004. The programme assesses the quality of primary care only, including preventive services, screening, treatment and management of illnesses. The programme is supported by a voluntary partnership of all four Health Maintenance Organizations (HMO) covering most of the Israeli population. As an academic directorate at the Hebrew University of Jerusalem, it defines the indicators and analyses and reports the data.

Performance assessment: quality of care is assessed entirely by electronic data provided by the HMOs from various sources, including medical and nursing records, pharmacy claims, laboratory results and hospital procedure codes. Data includes processes and outcome measures.

Improvement mechanisms: results from the QIS are reported in the public domain as well as to the Ministry of Health. The HMOs incorporate the results and their position in comparison to other results into their quality improvement working plans. Further systematic measures for translating assessment results into measures for improvement are not implemented.

Scotland

Healthcare system: health services in Scotland are financed almost entirely from general taxes and are largely free when needed and are available to all inhabitants. Responsibility for health and for health services rests with the Scottish Cabinet Secretary for Health, Wellbeing and Cities Strategy who delegates many of the functions related to healthcare delivery to 14 integrated territorial National Health Service (NHS) boards. They are responsible for planning and delivering all health services – acute, primary and community – to the population in their areas. There is strong accountability to the Scottish Parliament via ministers and through scrutiny by the parliamentary Health Committee, Audit Scotland and Healthcare Improvement Scotland within a broader National Performance Framework [44].

QIS governance: the QIS in Scotland is part of the Scottish National Health Service (NHS). NHS boards are accountable to ministries and the Scottish government for the quality of healthcare that they provide. The Scottish QIS is undertaken by Healthcare Improvement Scotland (HIS) which has two roles: Assessing services for their quality and supporting them in improving care. Services covered include long-term care, private psychiatric hospitals, NHS and private hospices, and prison healthcare as well as regular healthcare.

Performance assessment: HIS scrutinizes NHS and independent services for their quality of care by a range of methods, including indicators, peer reviews and focus groups.

Improvement mechanisms: results from the QIS are reported to service providers publicly as well as to the government. In case expected quality standards are not met, HIS authors and follows up recommendations and requirements.

Sweden

Healthcare system: health care in Sweden has its overriding goals stipulated in The Health and Medical Services Act which devolves the responsibility for providing healthcare and public health services to county councils/regions and municipalities. Health care is predominantly financed through regional and local taxes, supplemented by grants from the national government and patient fees.

QIS governance: QIS is based at the National Board of Health and Welfare (Socialstyrelsen). The Socialstyrelsen is active in various fields of quality assurance, licensing, evidence-based medicine, evaluations and it operates several central registries. These include registries on patients, cause of death, cancer, and prescribing drugs. Publicly funded healthcare providers have been obliged to send data to these registries since 1968.

Performance assessment: since 2006, data from the Swedish registries has been used for purposes of quality assessment. The Socialstyrelsen analyzes this data and processes it in cooperation with the Swedish Association of Local Authorities and Regions. In order to interpret the data, it is enhanced by data that is drawn from voluntary as well as mandatory registries and from patient surveys.

Improvement mechanisms: the Socialstyrelsen publishes assessment results in a public report once a year [35]. These public reports include benchmarks of the regions for some indicators. Reports compare services but remain descriptive. Interpreting the data, drawing conclusions and putting it into action is moderated by the authorities of the 21 Swedish counties which are responsible for the provision of healthcare.

Switzerland

Healthcare system: the Swiss health care system is characterized by a high degree of decentralization. The 26 cantons are responsible for the provision of health care. They are in charge of hospital planning that is based on criteria defined on a national basis. Coverage has been universal for all citizens since 1996. More than 2/3 of acute inpatient care is provided by public hospitals and publicly subsidized hospitals. The funding of the hospital system is distributed between mandatory healthcare insurance and cantonal subsidies.

QIS governance: the federal QIS in Switzerland is based at the Federal Office for Public Health (FOPH).

Performance assessment: the FOPH assesses quality by indicators once a year for all Swiss hospitals that provide acute care. Quality indicators are derived from the Initiative for Quality in Medical Care (IQM, Initiative Qualitätsmedizin), an initiative set up by several private and public hospital owners in Germany for measuring and improving the quality of inpatient care.

Improvement mechanisms: the FOPH publishes caseload and mortality rates annually for 41 different classes of diagnoses/interventions for all hospitals that provide acute care. The data is made available to the public on a website that allows a comparison by indicators of up to three hospitals. The FOPH does not interpret the results from indicator assessment but sends them to the cantons which use the results for information, healthcare planning and quality management depending on individual canton policy.

3.1. Governance

All of the mandatory QIS were established at the beginning of the 21st century. That said, Sweden was far ahead in terms of data collection and made the submission of data to patients' registries mandatory as early as 1968. However, data from these registries has only been used for quality assessment purposes since 2006. An overview on governance and scope of the QIS in the respective countries is provided in Table 1.

3.1.1. Mandate for quality assessment

QIS are mandated in most countries by central government, e.g. the national ministry of health or parliament. However, in countries with statutory health insurance it is also the health insurance companies that mandate QIS. In Israel, the QIS is mandated by the National Institute for Health Policy Research in conjunction with the country's four Health Maintenance Organizations (HMOs) which are broadly responsible for healthcare nationwide. In Germany, a joint self-governing body of healthcare providers and health insurance companies, the Federal Joint Committee, mandates the implementation of the QIS. In Denmark, the mandate for the QIS is jointly provided by parliament and professional societies. The professional societies that once set the basis for QIS by implementing registries, consider these registries not only a measure of performance benchmarks but also a source of research data.

In the majority of countries, the mandate for operating QIS is devolved to a public agency. This can be an institution embedded within a public body such as a ministry (Scotland, France, Switzerland). In two countries, universities play a major role in QIS: In Israel an academic directorate, which is based at the Hebrew University of Jerusalem, has been commissioned with conducting the national QIS and in Denmark more than 60 registries are served by three university departments specialized in clinical epidemiology. A third option is to mandate a private, independent institution with the execution of a QIS. This was the case

Table 1
Governance structure and scope of national quality improvement systems (QIS) in European healthcare.

	CH	DE	DK	FR	SC	SE	IL
Initial year of national mandatory QIS	2008	2004	2003	2008	NHS Scotland is expected to comply, however it is not mandatory	2006 Use of mandatory registries for QIS + voluntary registers which service providers are expected to comply with	2004
Body that mandates QIS	Ministry of Health	Federal Joint Committee	Parliament, professional societies	Ministry of Health and Haute Autorité de Santé (HAS)	Scottish government Health Directorate and Cabinet Secretary for Scotland	Ministry of Health, National Board of Health and Welfare, the county councils	The National Institute for Health Policy Research jointly with the four Health Maintenance Organizations (HMO) (i.e. sickness funds) of Israel
Purpose of QIS							
Clinical quality improvement	√	√	√	√	√	√	√
Choice, trust, voice (public reporting)	√	√	√	√	√	√	
Management of services			√	√	√		√
Inspection (safety, regulatory)		√		√	√		
Health system governance	√		√	√	√	√	
Contracting				√			
Sectors covered by national QIS							
Hospital care	√	√	√	√	√	√	
Mental healthcare		√	√	√	√	√	
Outpatient care		√	√	√	√	√	√ (primary care)
Social care						√	
Long-term care			√	√	√	√	
Integrated care		√			√	√	

in Germany were the QIS was mandated (after being put to tender) to the AQUA Institute, a private entity. However, in 2016 this mandate will be transferred to a public institution.

3.1.2. Mandate for sanctions

A specific mandate for healthcare inspections, including sanctions on healthcare providers and recommendations for improvements if quality standards are not met, is part of the QIS in Denmark, Germany, France and Scotland. In Switzerland and Sweden, the mandate is limited to providing information on the quality of care to the public, but above all to the cantons and counties. However, processing this information and putting it into action is the regional responsibility of the cantons and counties.

3.1.3. Sectors covered by QIS

QIS in two countries assess the quality in only one sector: Switzerland's QIS is at the moment restricted to acute hospital care (indicators are being developed for home care and long-term care) and Israel's to primary care only. However, recently a new programme was established by the Ministry of Health to also assess quality of care in Israeli hospitals. Denmark, Germany, France and Sweden, besides assessing the quality of inpatient care for all clinical areas, also assess outpatient care in at least some clinical areas. Sweden provides the most comprehensive QIS that covers hospital care, outpatient care, mental healthcare, social care, long-term care and integrated care. In Switzerland, the Association Nationale pour le développement de la Qualité dans les hôpitaux et les cliniques (ANQ, www.anq.ch), a joint organization of cantons, healthcare providers and insurance associations, publishes quality indicators (e.g. surgical site infection rates, pressure ulcers) which compliment the quality indicators published by the Federal Office of Public Health.

3.1.4. Purpose

Beyond the aim of improving the quality of clinical care, in all countries QIS seeks to provide transparent information on the quality of healthcare to the public. Further objectives of national QIS include offering citizens the possibility to choose their healthcare provider on the basis of information on quality, increasing trust in healthcare institutions through greater transparency and also giving patients' priorities a voice. All systems except the Israeli system include public reporting as a core aim. The core aim of the Israeli programme is to provide information on healthcare quality at national level to all stake holders for the purpose of healthcare improvement and for policy and planning. Public reporting by the HMOs has become a more central issue in recent years.

3.2. Measurement methodology

3.2.1. Instruments

Since it was an inclusion criterion, QIS in all the countries studied use indicators for measuring the quality of care (see Table 2). In France, this is supplemented by site visits in the context of accreditation. In Scotland, a range of guidance is used, and qualitative as well as quantitative standards are applied. In addition, public and staff engagement is monitored to explore specific issues related to the quality of care. Thus, indicators are just one method among others in Scotland for collecting information on the quality of care. Denmark, like France and Scotland, also relies on a number of parallel and only partly coordinated QIS approaches in addition to indicator assessment, such as patient satisfaction surveys and peer reviews in the context of a mandatory national accreditation system. This is different to Germany, Israel and Sweden, which base their QIS almost exclusively on indicators.

3.2.2. Frequency of assessment

Most countries publish indicators annually. In France, indicators are assessed biannually and accreditation is carried out every four years. In Scotland, the frequency of reporting varies according to the indicators, and can occur before the end of a year or indeed after a 12-month period.

3.2.3. Data sources

General data sources for QIS include electronically available routine data, extra documentation by healthcare providers and patient surveys. Table 2 provides an overview of the data sources each country uses. All countries use electronically available routine data (Switzerland and Israel exclusively), while the others also (or mainly, as is the case in Germany) collect data through additional documentation made available by healthcare providers. QIS in four countries, Denmark, France, Scotland and Sweden, have also implemented patient surveys and feedback as part of the regular quality assessment procedure; Germany is currently in the process of planning such a patient survey. These patient surveys are used mostly for assessing indicators on process and outcome.

In addition, qualitative methodologies are used in France and Scotland for collecting data on structures, processes and outcomes. In France, this comprises site visits in connection with the accreditation process, and in Scotland it comprises a multitude of methodologies. Follow-ups are measured in Germany, Israel and Sweden. France is currently drawing up follow-up assessment procedures.

3.3. Data analysis and interpretation

3.3.1. Data analysis

Usually reference ranges or standards are used for indicator analysis. Sweden mainly uses standards if available, otherwise data is presented as relative comparisons.

All countries except France apply risk adjustment to their data analysis, at least for the factors age and gender. Israel additionally uses socioeconomic status for risk adjustment, whereas Sweden uses Diagnosis Related Groups (DRGs), Germany a multitude of factors applied by logistic regression, and Scotland various methods of risk adjustment depending on the subject.

3.3.2. Data interpretation

There are various modes for interpreting the results of indicator assessment. Israel interprets its data based on the average collected by healthcare providers, as does Denmark (including standard deviation). Results

Table 2
Methodologies used for assessing quality of care.

	CH	DE	DK	FR	SC	SE	IL
Assessment by indicators	√	√	√	√	√	√	√
Assessment by other methods				Site visits in the context of accreditation	Variety of qualitative methods		
Focus of assessment							
Quality of specific diseases or therapeutic interventions (clinical areas)	√	√	√	√	√	√	√
General quality (indicators)					√	√	√
Quality of interventions for prevention and screening			√		Prevention and screening	Prevention and screening	Prevention and screening
Data source for assessing structures							
Manual/extra documentation		√	√	√	√	√	
Electronic systems at provider level	√		√	√	√	√	
Data at cost carrier level			√				
Patient survey					√	√	
Other methodology	Groupings of hospitals within the medical statistics			The accreditation process	Methodologies look at culture, leadership, values, behaviour which support quality		
Data source for assessing processes							
Manual/extra documentation		√	√	√	√	√	
Electronic systems at provider level		√	√	√	√	√	√
Data at cost carrier level			√		√		
Patient survey				√	√		
Other				The accreditation process	Methodology is tailored to service/area being scrutinized		
Data source for assessing outcome							
Manual/extra documentation		√	√	√	√	√	
Electronic systems at provider level	√	√	√	√	√	√	√
Data at cost carrier level			√				
Patient survey			√	√	√	√	
Other					Review of documentation, interviews with patients, carers, public, staff		Periodic research to assess additional outcomes
Data source for assessing follow-up							
Not measured	√						
Manual/extra documentation		√	√	√(not measured currently)		√	
Electronic systems at provider level			√	√(not measured for now)		√	√
Claims data			√				
Patient survey				√(not measured for now)		√	
Other					Follow-up visits review action plans put in place as a result of scrutiny activities		Follow-up of indicators is conducted in the following year
Data source for assessing quality of indication							
		√	√	√			

in Germany are interpreted using the average and the worst-performing hospital, whereas in France they are interpreted in relation to the best, the average and the worst healthcare provider. Scotland's data is reported both comparatively (between regional health providers) and relatively (such as an individual healthcare provider's performance over time). Switzerland and Sweden do not have a particular focus for interpreting their data. Data is provided as a service to the cantons/counties and it is up to them as to how they interpret it and use it. Denmark has a special arrangement in the clinical registries whereby the professional boards generally are obliged to formulate targets for improvement in relation to every indicator. This is done based on available evidence and practical experience of the professional board, and is documented in special reports.

3.4. Improvement mechanisms

Improvement mechanisms include how results from quality assessment are reported and to whom, as well as resulting sanctions and measures. An overview is provided in Table 3.

3.4.1. Level of presenting data

The countries usually present their data on several levels of aggregation: Single provider/service level, regional and country level. The level of the single provider/service is used by all countries. All but Switzerland and Israel present their data also on a regional level. In the case of Germany, the regional level is represented by the federal states which range in size from 1 million to 12 million inhabitants. With the exception of Switzerland, each country also presents its QIS data on an aggregated country level. As do other countries, Switzerland uses the OECD Healthcare Quality Indicators for benchmarking at a national level.

3.4.2. Data reporting

There are numerous audiences for the published data, such as the authorities at regional and country level, including policy makers and cost bearers, academics and policy makers, and finally the general public.

All countries report the performance directly back to the service providers. Furthermore, data is reported to the ministries of health in Denmark, France, Israel, Scotland and Sweden. They are reported also to the cost bearers of the individual healthcare systems, which, in Israel, France and Germany, are the health insurance companies (in Germany, the data is reported to the Federal Joint Committee which includes the health insurance companies). In Scotland, healthcare is funded by the National Health Service and in Denmark and Sweden by the regional governments to which results of performance measurement are reported. In Switzerland, results are reported to the cantons which are responsible for healthcare provision.

A benchmark of services is made available to the public in France, Sweden and Denmark where it can be reviewed on a website hosted by the regions. In Sweden, there are two sorts of benchmark reports that are available: One is a descriptive "open comparison" of the hospital at regional and national level; the other reports on the compliance of services with guideline recommendations. In Germany, hospitals are publicly benchmarked for survival rates of premature neonates. However, participation in this benchmark procedure is currently voluntary.

3.4.3. Sanctions, measures and actions

In Denmark and Scotland, healthcare providers that are not performing well are required to present an action plan for improvement. In Denmark, this action plan needs to be approved by the central regional management and often by the political council. For highly specialized services, such as cancer care, authorization to provide this form of care can be withdrawn by the national health board. In Germany, healthcare services that do not meet the expected quality standards are subject to a "structured dialogue". This means that healthcare providers have to justify the data that lies outside defined reference ranges, and in case of quality deficits, they need to present strategies for improvement. In France, if indicators show that the required quality standards have not been met, this may result in consequences affecting an accreditation decision. In Israel, Sweden and Switzerland, there are no defined consequences for performing below expectations. Consequences in Sweden and Switzerland may be imposed by the counties/cantons as they are responsible for their healthcare.

3.4.4. Follow-up of improvement

Measures that are taken to bring about improvement to low performing services are systematically surveyed in all countries, however in Switzerland, only if a canton decides to do so. In France, the HAS follows up healthcare providers that are required to improve their service quality. In Israel, this is done by the Chief Medical Officers of the four HMOs who are responsible for QIS. In Scotland, improvement support is available from Healthcare Improvement Scotland (which is the same organization that undertakes healthcare scrutiny). In Germany, healthcare providers that are required to improve their services are followed up either centrally by the AQUA Institute or by one of 17 administrative offices for quality assurance at regional level. In Sweden, the central public agency responsible for QIS (Socialstyrelsen) follows up with the county councils on their activities to bring about improvement. In Denmark, follow-up is done by a hospital's line management and at regional level. In some cases, scientific societies (gynaecology, orthopaedic surgery, cardiology) have follow-up procedures.

Financial consequences linked to performance of services are implemented in Denmark and Sweden. However, in Denmark pay-related performance has been tried only in two regions; in one of the regions, it has already been discontinued and the other region only reserves 2% of its budget for it. In Sweden, financial incentives exist in some counties and are linked to some indicators. Also, central government has linked indicators to incentives in certain specific areas. There is a continuous debate on the benefits and drawbacks of this practice in Sweden. In

Table 3
Reporting of data and sanctions.

	CH	DE	DK	FR	SC	SE	IL
Level at which results of QIS are presented							
Service level	✓	✓	✓	✓	✓	✓	✓
Country level		✓	✓	✓	✓	✓	✓
Regional level		✓	✓	✓	✓	✓	
Public benchmark of results			✓			✓	
Addressee of QIS results							
Healthcare providers or hospitals	✓	✓	✓	✓	✓	✓	✓
Ministry of health			✓	✓	✓	✓	✓
Public	✓	✓	✓	✓	✓	✓	✓
other		Federal Joint Committee	Regional management				
Consequences if quality standards are not met	None; it is up to cantons to implement consequences	Structured dialogue	An action plan has to be presented. Worst case: authorization is withdrawn	Accreditation decision	Recommendations and requirements	Consequences are implemented by the counties if they wish	None
Financial implication of not performing well	None	None	Two regions experiment with P4P (10% of hospital budget withheld until standards are met)	Piloting financial incentive approach		Action taken by some counties	None

France, a financial incentive approach is currently being piloted.

4. Discussion

National QIS hold a unique position in their respective health systems. However, this means that there is no means within a country to compare or exchange information on technical and operational issues. As there are particular technical issues that arise from implementing QIS on a national level, it follows that countries can benefit from mutual exchange and can learn from other national QIS [9]. Exchanging information with other countries, and thus, having the opportunity to learn from each other, is, however, hindered not only by a general unawareness of QIS in other countries (see Section 4.7) but also by a significant language barrier. National QIS usually publish their policies, methodologies and results primarily in their own language and as grey literature [10–15]. Also, the differences in health systems add to the complexity of understanding other national QIS.

This study brought together and compared seven indicator-based national QIS from across Europe and Israel. All of these national programmes were set up after the year 2000, indicating that QIS using indicators is a somewhat new and emerging field. In the last 15 years, there has generally been an increased interest in QIS, in particular for QIS using indicators and for peer reviews and accreditation [16]. Also, policies are becoming increasingly popular that promote the implementation of QIS which is also seen as a strategy to strengthen a country's health system [16]. However, this also highlights the fact that neither the market, nor self-regulations or voluntary efforts are sufficient to improve the quality of care provided in complex health systems [17].

Despite all countries being unique in their approach on how to assess the quality of healthcare, the study revealed considerable similarities between national QIS. These similarities could be used as an orientation for countries aiming to newly implement, restructure or expand their QIS.

4.1. Sectors covered

QIS usually start in one sector and then expand [8]. The more consequently a national QIS is implemented, the broader the scope is of the areas that it covers. This means that these QIS do not only assess the quality of care in respect to specific disorders, but also include prevention, screening and general healthcare quality indicators that cover a whole variety of healthcare options as recommended by the Council of Europe [18]. Contrary to illness-specific indicators, general indicators are used to either provide a measure for the quality of a health system as such, and thus, to determine policy and planning [8] (this, for example, is the main mandate of the Israeli QIS, operating by general indicators only) or, general indicators are used to measure general procedures within primary prevention, such as the Israeli QIS which assesses whether an adult should be weighed once a year by a general practitioner.

Most QIS have started operating by focusing on hospital care; however, the example of Israel shows that QIS can also originate from outpatient care focusing on a medical specialisation (primary care) instead of a specific intervention or illness. QIS that are currently active in only one sector (e.g. Switzerland, Israel, Germany) are aiming to expand to other sectors. With this in mind, it remains a challenge to all QIS to not only measure performance in different sectors, but also cross-sectorally. Some of the most relevant challenges to healthcare performance arise when patients cross sectors: [18] crossing sectors is inevitable, in particular when considering ever shorter hospital stays and a shift towards outpatient care. This is particularly relevant when treating chronic illnesses where patients may need care from different providers and medical specialities. This presents a challenge to the continuity of care in terms of information, management and patient-provider relationship [19]. Consequently, providing continuity of care has been defined as one major aspect of quality of care in health systems [20,21].

4.2. Routine data

Electronically available routine data seems to be the backbone of national QIS [22]. All QIS examined here use routine data at some point; some use them exclusively such as the Israeli and the Swiss systems. However, much data is assessed alongside additional documentation. Not only does this triangulated approach increase reliability, it also overcomes some of the challenges of single-use data, for example much of the data is collected to support reimbursement. The disadvantage of additionally documented data relates to it adding to the burden of documentation and to it being more susceptible to manipulation than routine data [23]. By having already implemented a well-functioning system for data assessment in general health monitoring, this facilitates the setting up of a national QIS [8,24].

Despite a number of similarities, there are also many differences between the countries' QIS. This is partially due to differences in national policies and legislations, but might, however, also be due to a lack of consensus and experience on how to best implement quality measurement and improvement measures. One of the striking differences is the way consequences are drawn from performance assessment. In the relatively centralised health systems of, for example, France or Germany, the agencies operating the QIS have the power to hold a health care provider accountable. In strongly regionally organised health systems such as the Swedish or Swiss health system, this is left to local institutions; it is the agency's role primarily to provide data. There is no knowledge as to whether this impacts on the effectiveness of QIS in terms of improving the quality of healthcare.

Further areas where QIS differ include:

4.3. Qualitative methodology

Only Scotland and France use qualitative methodologies in addition to quantitative indicators (focus groups, site visits within accreditation) for performance assess-

ment. Germany is planning to do so in the context of peer assessments [25]. While quantitative indicators have the advantage of representing quality in a reliable and comparable way, they have the disadvantage of usually being surrogates of procedures that are normally much more complex. Indicators disregard relevant issues that are outside their scope, such as patient–therapist interaction, and that might be difficult to measure [23]. In addition, "indicators only indicate" [8], they also need to be interpreted. Qualitative assessment methodology adds an individual and an explanatory aspect to quantitative indicators. By that, they value the diversity and complexity of care procedures and bring them closer to improvement mechanisms [26]. In addition, qualitative methods may help to understand and validate quantitative indicators. As such, enhancing quantitative indicator-based performance measurement with qualitative information seems to be a recommendable approach.

4.4. Patient centredness

The inclusion of patients' perspectives in performance measurement, as recommended by the Council of Europe, is present in those QIS that are more complex in the sense that they use different data sources and assess more than one sector (Denmark, France, Scotland, and Sweden). It is recommended that the patient's perspective also be included as many relevant outcomes such as pain, satisfaction or experience can only be assessed by asking the patient [27]. In addition, patients are often the only link between healthcare sectors and can thus provide information on relevant care issues, such as use of informal care that are outside the scope of the respective QIS [28]. However, it needs to be acknowledged that it is somewhat challenging both in respect of methodology, legal and data protection issues to implement meaningful patient surveys within QIS [29]. Thus, assessing the patient perspective would probably not be the first thing to be implemented in a newly developed QIS. However, being patient orientated also includes making the results of performance assessment available to the public and to potential patients in a way that can be understood by lay persons. Whether and how a QIS succeeds in this, is not known.

4.5. Improvement mechanisms

Direct feedback on performance assessment to the healthcare provider, comparison of the single provider to the mean of all the others and communicating aggregated results to the public are improvement tools that are used by all QIS analysed. These tools have been proven to be effective in studies [30–33]. However, what follows after reporting the data and to what degree the central agency implementing the QIS is mandated with executive powers in holding healthcare providers accountable, differs. Mechanisms at all possible levels of regulation in QIS are used in each of the countries: self-regulation and voluntarism, as might be stimulated by public benchmarking ("name and shame"), meta-regulation, such as mandated improvement, and command and control which could include withdrawal of accreditations [17]. While some countries use several mechanisms starting with "name and shame" through public benchmarking to withdrawing authorization (Denmark), others use only public reporting (Israel) or have no defined consequences at all for mal-performance (Switzerland). In Sweden and Switzerland respectively, regional bodies are responsible for defining and executing consequences. Pay for performance is not a regular part of QIS in any of the countries included in this study. However, most QIS have run trials on pay for performance in limited areas.

It needs to be acknowledged that the choice of consequences linked to performance measurement is the result of a political process. This might explain the differences found in the QIS studied. While there is evidence on the effectiveness of linking performance measurement to feedback and recommendations for improving quality of care in general [33], it is not clear which of the strategies for improvement is the most effective at national level QIS. Countries seem to differ in their conviction as to how rigorous they need to be in this respect [24]. However, in order to further develop QIS, it would be of necessary to explore in more depth, if at all possible, which additional effects can be expected from more rigorous consequences compared to just "naming and shaming".

4.6. Impact of QIS

Longitudinally, a general improvement on indicators is observed in all QIS with regard to both mean indicator values and the range of indicator values across services [32,34–37]. Improvements in process indicators might be interpreted as a sign that healthcare performance has in fact changed. Whether this impacts on patient outcomes, needs to be shown by respective outcome indicators. However, the relationship between processes and outcomes is not only always evident as such. Moreover it may also be blurred by the fact that improvements in process indicators might also be caused by better documentation of data. The question as to whether changes in performance and related outcome would have happened without a QIS will always leave room for debate. However, despite acknowledging that the direct impact of QIS on the quality of care is ambiguously to prove, we see QIS data shedding light on healthcare performance quality where prior this was not known [38,39], as well as confirming guideline adherence [40] and reducing variability in healthcare performance across services and regions [35]. In addition, all representatives from QIS agencies involved in the network reported that the level of attention paid by clinicians and the public to their quality reports had been rising over the years, indicating an increased sensitivity of both healthcare professionals and the general public towards the quality of performance of health services. Thus, it is no longer a question of whether implementing a national QIS in general is advisable, but more so, as to how a national QIS should be designed efficiently so that the least additional effort for data collection can be combined with the most useful assessment outcome in terms of information and promoting quality improvement. This in fact is the challenge that all QIS implementing agencies face and where exchange and networking is needed.

4.7. Limitations

This study focuses on countries in Europe and Israel as these were the countries meeting the inclusion criteria (national QIS using indicators situated in Europe and related countries) and that could be identified with the methods described. Experiences from other continents and countries such as Canada, the USA or Australia were not included even though including them might have changed the results. Further, QIS in Europe that use indicators such as the national outcome evaluation programme in Italy [41], were not included in the network as they could not be identified as meeting inclusion criteria by the methods described. This means that the necessary information was not available on the agencies' websites in any of the languages available to the authors, nor was it possible to identify any publications on the programme in English. In addition, none of the participants within the network had specific knowledge of the programme. This highlights both the need for networking among national agencies running indicator-based QIS to get to know each other better and for spreading information on these programmes in international literature. Also, the QIS in England could not be included. Despite repeated efforts, we could not identify a central institution in charge of the English QIS. Had we been able to include more countries in the study, this might have changed the results of this analysis. On the other hand, the network set out to start an exchange about QIS on a practical working basis, thus the inclusion of seven countries was considered to be a good starting point in a field where no networking on this level exists at all.

Trying to compare QIS in seven countries might be a bit like comparing apples and pears as health systems and their QIS are indeed complex. However, all systems are striving for the same objective: the improvement of quality in healthcare. It should, however, not be ignored that some of the terminology used when discussing QIS might be understood differently across countries and health systems. Having said that, having met in person and discussed the national QIS at a two day workshop where the questionnaire was also drafted, and having sent it back and forth between group members, this might have actually lowered the risk of misunderstanding.

5. Conclusions

On a country level and based on the findings of this initial assessment of QIS in Europe and Israel, policy makers that plan to embark on implementing national QIS would be advised to start in a sector where routine data is available and then gradually expand. As many QIS start performance measurement by using indicators only, this seems to be a doable approach. However, once a QIS is becoming more complex it is advisable to add also qualitative assessment methodologies as they add an explanatory dimension and are closer linked to improvement measures. Implementing feedback mechanisms that report performance data back to healthcare facilities, including a benchmark to the average, is central to a QIS; however, there is no supporting evidence to recommend the implementation of specific rigorous methodologies to hold healthcare providers accountable. Finally, having QIS being patient centred should be self-evident nowadays.

On the inter-country level transparency and benchmarking of QIS within Europe and in particular EU member states, becomes highly relevant when considering the EU directive on the application of patients' rights in cross-border healthcare. The directive strengthens national QIS in the sense that information on quality of healthcare needs to be available also to individuals from other member states (thus being available also to a country's own citizens). In this context, an exchange between agencies commissioned with implementing national QIS adds value not only on a technical level, but also at EU level [42]. In addition to inspiring others, such an exchange adds to the possibility of

- Getting to know, better understanding and appraising QIS from other countries;
- Exchanging and sharing information gathered on technical issues;
- Finding a common language to address issues of performance measurement and quality improvement;
- Striving towards a common understanding of quality of care assessment, including indicator identification, data assessment and analysis, as well as recommendations to policy makers and healthcare providers;
- Being able to provide better information on the quality of healthcare not only to a country's own citizens, but also to those from other EU member states;
- Working towards obtaining better evidence for the effectiveness of performance improvement mechanisms at health system level.

In summary, it needs to be acknowledged that little is known about the impact that the different tools used and measures taken by national QIS have on the quality of care at health system level. As a considerable amount of tax payers' money is spent on national QIS, research in this respect is very much needed. This research needs to be based on an exchange between countries and health systems [8,42].

Conflict of interest

All authors state that they have no conflict of interest.

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